

### **ABSTRACT**

A method to determine the shape data of a complex curve surface using reference templates from a copy of the workpiece before it was used and the undamaged portion of the used workpiece so that the damaged portion of the workpiece can be reconstructed. The reference template is scanned in layers, including the portion corresponding to that which has been damaged in the workpiece, as well as adjacent undamaged portions of the used workpiece. Offsets of the reference template and workpiece are generated, based on corresponding portions of the reference template and the used workpiece. A new set of offsets of the damaged portion of the workpiece is then calculated. This calculated set of offsets is then used to calculate further profiles until a complete profile of the damaged portion has been predicted.